Organizational Boundary Defense; an Experimental Design

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Abstract

Complexity Leadership Theory (CLT) discussion revolves around the distribution of leadership authority and execution across the organization. Leadership must be distributed across the organization, leveraging all available expertise in decision-making and direction. Jerry Hazy and Mary Uhl-Bien developed three tenants of Complexity Leadership and refined them into five functions in their work (11). We discuss how that system should include Organizational Boundary Protection which, we believe, is the missing part of CLT. This study works to explain organizational boundary definition and protection, and seeks to expand CLT to include the idea of Organizational Boundary Protection.

This study begins from the accepted position that a Pareto Power Law distribution (commonly known as the 80/20 Rule) (3) should explain the ideal execution of tasking in an organization. That is to say that ideally an organization that aligns with complexity leadership theory and utilizes a distributed decision-maker process executes work to a Pareto distribution: 20 percent of incoming tasking (information) is important to the organization and absorbs 80 percent of the organization's resources and effort (transformed into organizational knowledge). Accordingly, the collective decision-makers should commit 20 percent of their time dispatching the 80 percent of inconsequential tasks (information that will not be transformed into organizational knowledge). To gain some early insight on this potential phenomena, this proposed study collects a medium size organization's e-mail volumes and includes a self-assessment by e-mail recipients on the value of the information provided by the mail. The hypothesis of this study is that there will be a delta between the ideal Pareto Power Law distribution and the organization's distribution. The study assesses that this delta is a measure of the organizations knowledge processing inefficiency. Finally, the study attempts a first order validation of this hypothesized inefficiency through an online workforce survey. The survey participants are further categorized by level of experience and organizational position to determine the impact of these factors.

1. Introduction

An explanation for why the Garbage Can Theory (8) does not actually result in organizations disintegrating into chaos can be explained by Complexity Leadership Theory (CLT); however in order to do that, CLT must also address boundary protection, which it currently does not do.

Much of the CLT discussion revolves around the distribution of leadership authority and execution across the organization. Because of the complexity of postindustrial organizations and their environments, leadership must be delegated across the organization, leveraging all available expertise in decision-making and direction. Jerry Hazy and Mary Uhl-Bien (11) developed three tenants of Complexity Leadership and refined them into five functions in their 2013 work. Cohen, March and Olsen (8) more aptly called the modern complex decision-making process "organizational anarchy". This describes the unstructured process of problems, people, and solutions being thrown together, much as items are thrown into a garbage can. This chaotic mixture becomes the "choice opportunity". CLT goes a long way toward explaining how modern distributed organizations structure their decision-making to address complexity before it becomes chaos.

The three original tenants are administrative, adaptive, and enabling leadership, which they reinterpreted into the five leadership functions: generative, administrative, community building, added information gathering, and information using. From these parts emerges a greater and more holistic system. That system should also include Organizational Boundary Protection which, we believe, is the missing part of the CLT. Organizational Boundary Protection is the concept that distributive leadership requires a certain level of organizational networking to ensure organizational priorities are defined and protected. This study works to explain organizational boundary definition and protection, and seeks to expand CLT to include the idea of Organizational Boundary Protection.

Capra, in his Web of Life (5) treatment of networks, identifies that effects can only be measured

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at the system level of analysis; they cannot be defined at the parts level. Narayanan, Colwell & Douglas (12) identify that an industry's leadership decision-making process (in this case pharmaceutical companies) is significantly affected by external influences.

History is abundant with examples of how these externally driven decisions don't always result in the best outcomes. Drawing from the work of Susan Scott and Wanda Orlikowsky (17) on the impact of transparency and the dynamic influence of external demands; these demands rapidly become ad hoc governance. We believe Complexity Leadership Theory's five functions are still insufficient to explain how complexity leadership is supporting and shaping the post-industrial technical bureaucracy: there is no accounting for the exogenous tasking, governance, and oversight that has become omnipresent in the current environment, which often erodes the focus and execution of the organization's core mission or purpose.

In short, Complexity Leadership implies, but doesn't speak to, boundaries of the organization directly, yet most of the complexity is external to the boundaries of the modern organization—the unknown or unforeseeable drivers. To that end, we believe that successful organizations are defending their position, mission, and workforce to mitigate, if not remove, the effects of the external demands: supplementing with a sixth leadership function.

Successful organizations are metering external influence to defend their culture, but also to ensure they focus enough on their defined mission/purpose to stay successful and relevant. (2).

2. Literature Review

Following the trajectory of Coase's Firm theory (7) to Arena and Uhl-Bien's (2) addition of firm dynamics to their human capital focus, there is the greater articulation of an additional concept on the firm and how it ties to the idea of social capital. They define social capital as "the competitive advantage that is created based on the way an individual is connected to others". The important expansion on social capital is their development of Coase's transaction model into a social dynamic comprised of two aspects: group cohesion and brokerage (2).

The tipping point is between measuring the connection between individuals within the same group, called group cohesion, and how different groups are connected with each other, called brokerage. This is instrumental in identifying the concept of organization defense; though it is implied, it is never stated or defined.

The defense of the organization's boundaries is inherent, if not discussed, when considering Arena and Uhl-Bien's explanation of highly interconnected clusters within the organization and the need to expand them across the organization to ensure an interactive environment across the whole.

Grant (10) goes further, stating that organizations resources are in fact knowledge. Given that knowledge capture and movement is integral to the organization, network theory goes a long way to describe knowledge flow, which enables distributed decision-making, within the organization, and the definition of the organizational boundary which meters knowledge flow across the external boundary. Knowledge Flow Theory (KFT) is the principles and techniques that explains the movement (vectors) of knowledge between individuals and organizations or groups (13). This theory is a relevant starting point for how information moves across and through an organization and, by proxy, its management. It also clearly delineates between tacit and explicit knowledge and their relative degrees of stickiness—how well the knowledge transfers and is retained. KFT provides a vector for distributed leadership coalescing and aligning decision-making and provides metrics for measuring the performance of knowledge transfer, which implies, if not explains, the defending effects.

Von Bertalanffy's General system theory (19) as a science of wholeness and openness to influence from the outside environment is very applicable to organizations. Open systems are characterized by continual flow and change. Capra expands upon General Systems Theory and describes open systems as "open" because they need to feed on a continual flux of matter and energy from their environment to stay alive (5) and this, correspondingly, applies to organizations as they thrive upon the continual influx of information and external drivers and taskers.

Complexity leadership theory explains how the traditional hierarchical, organizational leadership model is becoming ineffective at solving complex challenges and in identifying and acting on rapid shifts in opportunities (2). The theory suggests that leadership is more than a role, style, or approach, but rather, it is an emergent process that occurs as organizations work through the tensions, pressures, and interconnections; an attribute needed to survive, and thrive, in a complex environment (2). Complexity leadership theory proposes that organizational effectiveness depends on dynamic, interrelated forms of leadership which enable creativity and scale innovation to form into new organizational capabilities (2). The leadership capabilities literature explains that technical, emotional, and social intelligence competencies are instrumental to the effective

development and performance of leaders (4). This study considers this in the analysis of the Naval Laboratories leadership.

The Pareto Principle referenced by Barabasi (3) reflects roughly the power law and explains the optimization of competing demands, which often displays showing approximately 20 percent of effort in a variety of fields will result in around 80 percent of the return (e.g. 20 percent of employees produce 80 percent of the useful work). The Pareto Principle would be a point of departure for how distributed complexity leadership protects the organizational boundary - effectively identifying the 20 percent of external syncopation to divert 80 percent of the organizational disruption.

3. Theoretical Gap in Complexity Leadership Theory

While CLT identifies agility and opportunity as exemplars (2), it doesn't take into account that organizations have finite resources and, to remain successful in their mission (achieve their purpose), they must be mindful of which external opportunities to act upon based on their mission priorities. Ronald Coase's Theory of the Firm (7) proposes that the existence of the firm is to limit transactional costs across the organizational boundary. This is to say the firm only acquires external services and resources when it is economically advantageous—it is cheaper to buy than to produce.

This implies rational decisions protect the organization from undue outside influence. The current complexity leadership environment is punctuated by attention-getting, disparate, syncopated tasking, tasking that comes in asynchronously and unprioritized; it seems to belie firm theory thinking. It may be more accurately represented by Availability Bias Theory (18); choosing that which is most current in memory, rather than most important. Tversky and Kahneman show that this pattern of decision-making is exhibited in everyday decision-making. Complexity organizations' leadership must be purposefully countering this basic tendency for their organizations to experience long-term success in management environment of high volume and velocity decision-making. CLT currently doesn't identify how leadership sorts and manages these drivers from outside the organizational boundary. We believe this phenomenon is represented by one of the Department of Defenses (DoD) Naval Research and Development (R&D) Laboratories and intend to use it as an exemplar for this study.

We use the term syncopated, rather than asynchronous, because the metaphor describes more than just information coming in and out of sequence, or pattern. These tasks are not random; rather they are presented in a rhythm of their own, which doesn't align with the organizational mission rhythm. These syncopated tasks cause leadership to act on less important tasks (beats) that are more recent and loudly stressed. Similar to music, syncopation unduly captures our attention and distracts from the main melody. By explanation of the Availability Bias Theory, syncopation is unexpected tasking that, due to proximity, takes on greater importance, and accordingly usurps prioritization and resources causing diminished direction and execution. This results in decision making that is warped; acting on the most recent, loudest, task rather than the most important task. Over time, this pattern breaks down management discipline and the organization's direction. Our preliminary interviews indicate this happens a majority of the time; the organization's focus on mission is routinely hijacked to act on lesser activities that have the immediate loudness to distract.

Examples of these syncopations are sudden training requirements because of an accident, an event that had a detrimental outcome, increased audit preparation efforts, unplanned government shutdowns, and funding interruptions. None of the examples above have anything to do with the mission of the organization, which is to develop Command, Control, Communications and Computers, Intelligence Surveillance and Reconnaissance (C4ISR) technology for delivery to the naval warfighter to ensure they are always best prepared technologically to defend the country.

Embedded in the amount of information and tasking bombarding leadership, is staggered pacing and the over-stressing of normally minor tasking; this makes the tasking take on greater importance than it should and distorts decision-making, recourses prioritization, and impacts effectiveness. Yet there are successful organizations, of which the Research and Development (R&D) laboratory is an example, that make decisions based on facts and priorities, rather than proximity and vividness of the stimuli. Complexity Theory currently doesn't adequately explain how these organizations filter the noise across their boundary and remain focused on the important mission tasks (11, 2).

4. Experimental Design and Methods

Alberts and Hayes (1) provide an exceptional roadmap to developing and executing experimentation. They cover from inception through execution and stress the more absolute requirement to plan and execute collection, analysis, and dissemination of not only the

findings but also the greater impact for the organization (in their case DoD). The experiment is only valuable if the knowledge gained is extensively spread so that others can act on it.

4.1. Research Questions

Research questions we plan to address fit into the operational category; what organizational changes support the leadership's need to defend the organization's information boundaries that will best position the organization to meet future challenges and opportunities of a complex environment? Understanding the potential Pareto characteristics of the external unfunded drivers may create efficiency in defense.

4.2. Hypothesis

Based on theory that Pareto would be the ideal for effectiveness, reached through driving 80 percent of effort and resources being devoted to 20 percent of the tasks. That leads to the following hypotheses:

Hypothesis 1: At the organizational level of analysis, less effective organizations have a knowledge processing curve diverging from a power law curve. The delta formed between the actual and the ideal is the measure of ineffectiveness.

Hypothesis 2: At the individual level of analysis, the less effective distributed decision-makers may have a knowledge processing curve diverging from a power law curve. The delta formed between the actual and the ideal is the measure of ineffectiveness.

Further refined hypotheses may then be derived from those stated above:

1. Collaborative communication leads to aligned decisions, which in turn leads to aligned resource commitment, and results in greater boundary defense.

2. Collaborative communication and aggregated greater resource commitment leads to a faster network formation, and results in a greater boundary defense.

3. If the Pareto Principle is instantiated in this network whole, then approximately eighty percent of results are derived from approximately twenty percent of the effort. Where effort is defined as 20 percent of aligned decisions, and the result is identified in eighty percent of organizational defense.

5. Study Setting

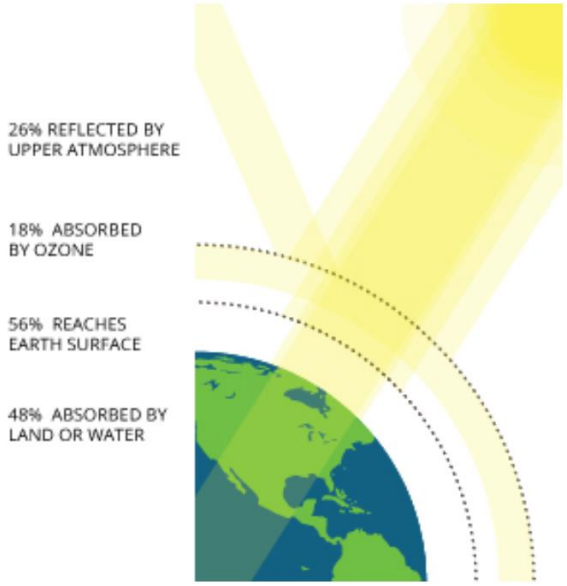
We will utilize a medium-sized DoD Naval Research and Development (R&D) Technical organization within the federal government that has undertaken technically challenging and risky scientific work since its creation in 1943. A great majority of the organization's employees possess degrees in science and engineering including many with advanced degrees (MS and Ph.D.). As a government R&D facility, the work has always been technically varied, explorative, and consistently pushed the boundaries of the organization's knowledge. These varied assignments called for expertise in engineering and the theoretical sciences and, as such, this expertise was highly valued.

Considering Boyatzis' (4) insights on the impact of managers' mindset on decision-making, the proposed study draws insight from the same Naval R&D organization that previously completed semi-structured group interviews of organization-level leaders and managers taken during an earlier study. Early coding showed that leadership was frustrated by external, out of mission scope, tasking, and oversight. (16).

6. Conducting the Study

Leveraging both von Bertalanffy (19) and Capra's general systems theory (5), we can see that their concepts are very applicable to organizations. Open systems are characterized by continual flow and change. An example is the earth (an open system) requires continuous energy input from a source (the sun) external to the earth system.

Extracting a further analogy from the earth open system: just as the earth has a porous boundary (the atmosphere) that regulates the amount of energy reaching the biosphere of the planet, ensuring that enough reaches to generate life, but not so much that it kills off life, organizations must have boundary that regulates information.



Only 56% of the solar radiation that reaches the atmosphere makes it through to earths surface.

Figure 1: Earth's boundary protection

By analogy, an organization requires external drivers and taskers, to remain functional and relevant. In the earth example, there are energy limits, within which the system (earth) can function properly (sustain life)—too little energy and entropy ensues, too much energy and the earth burns up. This study shows that this is true, too, of the organizational system and its sustainment by external tasking and the boundary defense mechanism being decision makers within the organization. Too little information and the organization perishes from irrelevance. As described earlier in Garbage Can Theory (8), too much information and the organization becomes a quagmire, incapable of timely decisions.

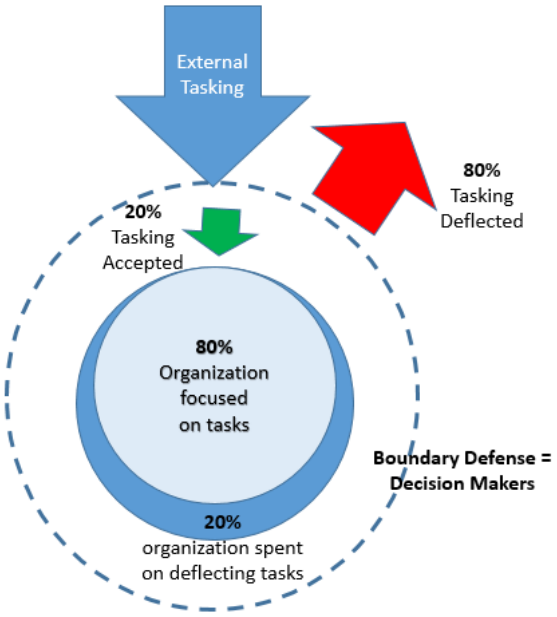


Figure 2: Organization's boundary protection

Drawing upon the Pareto Power Law, the ideal boundary would graph out as a Pareto distribution; generally focusing 80 percent of effort on 20 percent of important tasking, and 20 percent of effort spent removing the less important 80 percent.

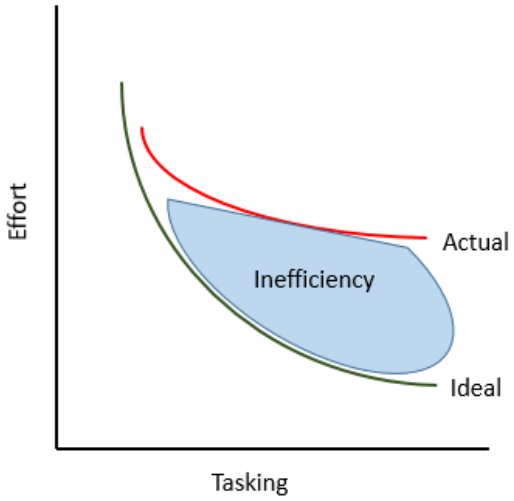


Figure 3: Effort/ Tasking Pareto

Research Question: Does a normal organization's tasking show a Pareto-like curve? How much of delta from the Ideal Pareto is exhibited?

Hypothesis: the Delta between ideal and actual Pareto curve is the inefficiency of the organization's tasking

Conceptual study depiction:
The ideal boundary is 80% of the organizations resources are dedicated to external tasking, and 20% of organizations resources are dedicated to deflecting 80% of external tasking.

This can be measured if all external tasking is captured through an organizational tracking mechanism. Similarly email is one form of an organizational tracking mechanism, so we explore how this relates to the same ideal boundary concept, how an individual concentrates their effort on their critical email and attempts to minimize the amount of effort expended in dispatching the rest. The closer this pattern of email execution aligns to a power law curve (Pareto) the more efficient the process.

A department of approximately 700 people will be provided with an online survey examining their individual email experience and use to determine their tasking efficiency and effectiveness, using email processing on a standard day, as an example. The following questions were tested in a HICSS tutorial which showed promise and will be asked again in the statistically relevant department sample:

- Q1 - How many emails do you receive on an average work day?
- Q2 - Of those emails, how many are work-related?
- Q3 - Of those work-related emails, how many require some action?
- Q4 - Of those emails that require action, how many are critical to your job?
- Q5 - What percentage of your time on email is spent initially reviewing all emails?
- Q6 - What percentage of your email time is spent prioritizing?
- Q7 - What percentage of your email time is spent on simple actions?
- Q8. What percentage of your email time is spent on items critical to your job?

Independent variables: Organization's time, resources and external drivers
Dependent variables: Percentage of time spent on tasking

- Pareto Principle: 80 percent of results are derived from 20 percent of the effort
  - Define the 20 percent of aligned decisions
  - That result in 80 percent of organizational protection
- 20 percent of the external syncopation results in 80 percent of the organizational chaos
- Pareto set:
  - trade number of alignments for best alignments
  - challenge biggest external disruptor rather than all disrupters

7. Data Collection

A survey of a 700 member department is in collection as of this writing. Data is collected through the organizational knowledge management system; it will be reviewed for consistency, then processed through several quantitative tools. From this small sample we hope to show a skewed Pareto Power curve emerging between the importance of an email and time committed to processing the email

8. Analysis

Data will be plotted to mathematically and visually identify if findings are statically in line with the Pareto Principle as expressed in an optimal curve and, if so, identify the expression of the Power Law as ideally approximately twenty percent of external organizations or people that are eighty percent of the time and cost sinks to the organization. If results are promising, further testing of the action's process is propositioned to other organizations. The delta between ideal and the experimental curve resulting from the collected data will be measured. The analysis of this delta can be an explanation of the organizational inefficiency..

8.1. Data Analysis

Statistical analysis of defined independent variables and possible Pareto Principle (power law) characteristics in external unfunded drivers.
By reviewing the data at different phases of the study and through differing means, greater rigor, and by extension validity, can be inferred.

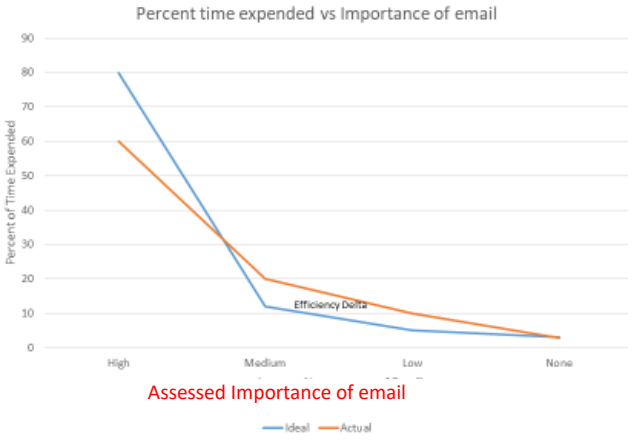


Figure 4: Sample Survey results

9. Limitations & Validity

We use email as an example of how organization's efficiently address tasking yet there may be no relation between addressing an organization's tasking and addressing an individual's email.

The scope of the study is constrained to one out of ten departments; the Intelligence Surveillance and Reconnaissance (ISR) department will be sent a link to the survey via email and respondents requested to participate anonymously to ensure complete and unfiltered responses.

10. Conclusion

Over the last decade, Complexity Leadership Theory (2) has identified and explained how successful organizations are adapting to the new leadership challenges. CLT explains how leadership functions have been distributed, minimizing, to some degree, the focus on the individual leader, but rather the decision-making of those best able to make them within the organization. CLT expanded from its original three tenets (administrative, adaptive, and enabling leadership) reinterpreting them into five leadership functions: generative, administrative, community building, and added information gathering, information using (11).

Leveraging and expanding on their insights, we believe Complexity Leadership Theory's five functions are still insufficient to explain how complexity leadership is supporting and shaping the post-industrial technical bureaucracy: there is no accounting for the exogenous tasking, governance, and oversight that has become omnipresent in the current environment, and often erodes at focus and execution of the organization's core mission or purpose. In short, Complexity Leadership implies, but doesn't speak to, the boundaries of the organization directly, yet most of the complexity is external to the boundaries of the modern organization—the unknown or unforeseeable drivers. Furthermore, most of these drivers or tasks do not align with the organization's priorities (mission). They just seem to be more attention-getting "louder", which we attribute to the impact of Availability Theory (18). We call these attention-getting, but not necessarily real organizational priorities that cross the firm boundary (7), syncopated tasking.

Our experiment strives to identify and capture this through polling individuals on their sorting and executing their decision making as displayed in the most common way most organizations and individuals process information into actionable knowledge: email. Based on our experiment, the delta between the Pareto Power Curve of an ideal organization's information processing and the actual organization experimented on, is hypothesized to be the actual organization's information processing inefficiency. This inefficiency is likely explained through organizational boundary theory and could be the missing piece in CLT, explaining how complex organizations defend themselves from excess, syncopated distracting information and diminish proximity bias.

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